# PS

POWERSOURCE


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# from the CEO

santee cooper

I want to call your attention to a proposed federal regulation which, at a minimum, will significantly increase every South Carolinian's electric bill and could also threaten our state's continued ability to recruit and retain industry that sustains our economy, our families and our quality of life.

The U.S. Environmental Protection Agency recently released a proposed carbon dioxide ($CO_2$) emissions rule that hits South Carolina hard, requiring the largest carbon intensity reduction in the country. It's a rule that electric utilities here have been planning for, but unfortunately our proactive efforts are working against us.

For example, Santee Cooper has added significantly to our renewable energy portfolio, opened a large natural gas generating station, launched an aggressive energy efficiency campaign for customers and closed our older coal units. And we are partners in building two new nuclear power units, a roughly $10 billion project that will bring 2,200 megawatts of reliable, emissions-free electricity to the state's grid. Our initiatives will reduce our $CO_2$ rate 44 percent by 2029 and still deliver electricity that is reliable and affordable.

If the proposed $CO_2$ rule stands, it could increase the average South Carolina residential customer's bill by 12-22 percent and the average South Carolina commercial customer's bill by 16-28 percent, depending on the rate of economic growth between now and 2030.

I mentioned Santee Cooper is building new nuclear generation. Unfortunately, the EPA rule sets a steeper emissions reduction target for South Carolina by treating these two units as if they are already built. We need to convince EPA to treat nuclear power equitably in its final rule, which is due next year. We will still need to take additional steps to reduce emissions, such as increasing energy efficiency programs or building more renewable generation, but proper treatment of nuclear could reduce costs associated with this regulation by as much as half.

Customers are already paying for these nuclear units. If the rule stands, we will have to pay even more for additional, high-priced $CO_2$ reductions from other measures that are neither reasonable for us to implement nor cost-effective or reliable for the state. Again, the initiatives Santee Cooper has already proactively undertaken, if properly credited, will reduce $CO_2$ emissions by 44 percent. EPA's goal is a 30 percent reduction nationally, and so we would be well ahead of that average.

The clock is ticking. Please consider voicing your concern over the draft $CO_2$ rule by commenting to the EPA before Dec. 1. You can find information on how to do that at www.santeecooper.com. Click on About Santee Cooper and then Energy Matters. Look for the section titled What You Can Do. And thank you for your consideration.

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GENERAL ELECTRIC

# John S. Rainey Generating Station:

# A Field of Dreams

By Susan Mungo

Photography by Jim Huff

When Santee Cooper received the permit in 2000 for what would become the John S. Rainey Generating Station, a 200-acre site near the Savannah River in the small community of Iva, S.C., many may have felt the utility was embarking on an entirely new ballgame.

Producing energy with a state-of-the-art natural gas facility capable of generating more than 1,000 megawatts of electricity was indeed a new approach for Santee Cooper, a predominately coal-fired generating utility. This was uncharted territory.

Santee Cooper's goal was to increase fuel diversity and enable the company to better meet the needs of customers statewide.

## Field Position is Key

Two key players for a plant of this type are gas availability and water access, so the right location would be a major component to its success.

One factor in choosing the location was the proximity to a major natural gas pipeline. This meant constructing Rainey either in the Midlands or the Piedmont. Santee Cooper ultimately purchased land for the plant in southwestern Anderson County.

This location allowed for the use of the Williams Transco gas pipeline that feeds gas from the Gulf of Mexico through the South to the Northeast. This area also had Lake Russell, a water source stretching 30 miles up the Savannah River to the Lake Hartwell Dam, located in Georgia near the Rainey site. Clean water was a major player in two ways: It's necessary for steam generation, and it produces few maintenance issues for the units.

## Strike One

After Santee Cooper announced its plans for Rainey Station, there were some Upstate concerns about the possibility of negative impacts from pollution, noise and the use of water from Lake Russell.

"We had a few express concerns, but we assured everyone that these units were going to be clean and efficient and also tightly regulated," said Dickie Thorndyke, Cross Generating Station Manager and the first manager at Rainey. "We explained to them that these units would burn gas as clean as a gas stove and that there would be extremely minimal amounts of byproducts or waste."

Rainey's combined-cycle units would be some of the most efficient turbines available, using both the combustive energy from the gas and the heat-generated steam to produce electricity.

Santee Cooper's goal was to create better fuel diversity and enable the company to better meet the needs of customers across the state.

**Page 6:** A lone fishing boat can be spotted in the distance on the clear waters of the Savannah River as it flows downstream from Rainey Station.

**Left:** A close-up view of a combination pipe threader and cutter used for maintenance.

**Top left:** Jeff Brock, an E&I technician A with 11 years of experience at Rainey Station, is busy preparing a pipe that is needed for maintenance.

**Top Right:** The stacks from Units 1A and 1B are towers against a beautiful Carolina sky.

Santee Cooper also made sure the public knew the plant would be operated by locals. They were looking to hire more than 40 people, many of whom would come from the surrounding area. It's a promise Santee Cooper has kept as about 70 percent of Rainey employees are Anderson County natives.

## Loading the bases

Construction moved along, and in less than three years the first phase of Rainey Generating Station, a 460-MW combined-cycle unit, began commercial operation on Jan. 1, 2002.

By May 2002, Units 2A and 2B, two 146-MW simple-cycle combustion turbine units, were also in service. Rainey was still growing and in 2004 Units 3, 4 and 5, three additional 75-MW simple-cycle combustion units, came online.

By 2004 the Rainey station was capable of supplying nearly 1,000 MWs of generation out of Anderson County — enough electricity to light up more than a half-million homes.

Due to Rainey's efficiency and cost-effectiveness, the plant had been running basically at full speed since it came online. Rainey's

Superintendent of Operations Carl Price has seen much of the day-to-day operations at Rainey for the 12 years it has been in service. Having worked at both Cross and Winyah, Santee Cooper's largest coal-fired stations, Price said the rules of the game changed a bit for him at Rainey.

"The process of generating electricity at Rainey is more of a delicate process," he said. "It takes a bit of a different temperament, and the fun for me has come in going from a brute force way of making energy, to a cutting-edge precision way."

## Foul Ball

In 2008, Santee Cooper and everyone else were feeling the strain from a full-blown recession. With demand for electricity down, Rainey station was running at less than full capacity. They would fire up as load demanded but basically only during peak times. Coal was cheaper than natural gas to burn, which meant cheaper energy costs for customers.

**Bottom left:** Rodney Gibert is a unit operator at Rainey Station. He is an Anderson native who served in the U.S. Navy prior to coming to work at Rainey in 2004, where he has been answering the call for power for 10 years.

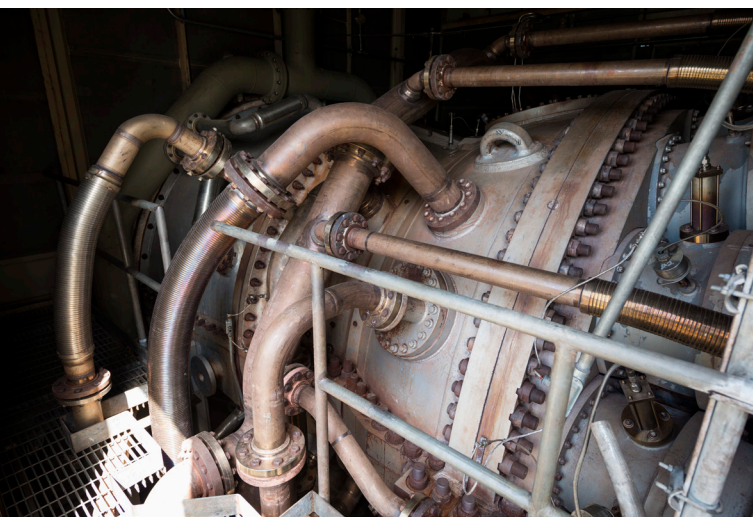
**Below:** Tammy Jackson, another Anderson county native, has been working at Rainey Station for 13 years. Her job as a technical associate working in the water plant requires that she take frequent water and air quality samples for testing.


However, it was a year of big political changes with the election of President Barack.

"On the heels of the presidential election came large-scale changes for those in the business of generating coal-fired electricity," said Phil Pierce, senior vice president of generation.

"Environmental agencies and special groups began pushing for major reductions in emissions from all coal-fired units and got the results they were looking for as new laws were passed," Pierce said. "Santee Cooper complied with the new regulations, which of course drove up the cost of producing electricity from coal, a cost we had to pass on to our customers."

During the next few years, Santee Cooper continued to diversify its fuel mix and deal with the changing regulatory landscape. The utility also began to see the price of natural gas fall with the widespread use of hydraulic fracturing.



**Top:** The cooling tower at Rainey Station works to cool the water used to condense steam back into water which can then be used for the steam turbine. The clean water pulled from nearby Lake Russell and the Savannah River helps with maintenance on the equipment at the station.

**Above:** An inside view of a combustion turbine.

**Right:** The steam lines coming off of the heat recovery steam generator form a complex maze.

**Above:** Shift supervisor Travis Thomas operates a crane that assists in lifting heavy equipment needed to work on and maintain the steam turbine.

**Left:** The stacks of Units 1A and 1B are visible through the mist of the cooling tower.

## Home Run

Hydraulic fracturing or "fracking" refers to a procedure that creates fractures in subterranean rock formations that allows more oil and gas to be recovered. Suddenly, the United States was awash in natural gas reserves.

Rainey went from running one unit on occasion in 2009 to running every unit in 2013. The combined cycle units run basically nonstop, and the simple cycle units are brought online each day as demand dictates. That need is something that Rodney Gibert, unit operator at Rainey, knows all too well.

"I have 10 years of experience here, and I have worked both as an auxiliary operator and a unit operator. What I love the most is being ready and able to stop or start a unit at the touch of my fingers the minute we get the call from Santee Cooper's Energy Control Center," he said.

Not only is Rainey running full tilt, but it's always done it extremely efficiently — something that has not gone unnoticed. One of its

combined-cycle units was recognized in 2013 by Megawatt Daily, an electric utility trade publication for operating the most hours. Rainey's other combined-cycle unit came in at number four. It's a result that Station Manager Keith Smith said is due to some key planning.

"We work diligently on preventative maintenance to make sure we are running, or ready to run, as efficiently as possible," he said.

The plant is also experiencing low gas prices, which help keep operation costs down. Smith thinks both are important ingredients to Rainey's success but adds, "I believe the most important element of our success is the teamwork and dedication of the Rainey employees."

## Game On

No longer just a field of dreams, Rainey Station is a strong team member that's ready to come to bat whenever needed for Santee Cooper and its customers. It adds diversity to the company's fuel mix as its units provide quiet, clean, efficient, and affordable electricity for the people of South Carolina.

**Top right:** Units 2A and 2B, two 146-MW simple-cycle combustion turbine units.

**Below:** You can see the pipe bridge that carries steam from Unit 1 to the steam turbine at Rainey Station.

# BENEFICIAL USE

of coal ash from Santee Cooper's generating stations

BY WILLARD STRONG

PHOTOGRAPHY BY JIM HUFF

When industry, government and innovation collaborate, great things can happen — and they're happening now as Santee Cooper continues to forge new frontiers with the use of coal ash from its generating stations.

Since this past March 17, at the retired Grainger Generating Station, large trucks have been lining up in the early morning hours to take on loads of coal ash from a storage pond at the Conway site. Once loaded, the trucks and their valuable cargo head for Orangeburg County, where cement manufacturers use this key ingredient to make their product.

Last year, on Nov. 19, Santee Cooper announced plans to utilize all of the coal ash from not only Grainger Station, but also from ash ponds at Jefferies (coal-fired units 3 and 4 have also been retired) and Winyah generating stations. It's called "beneficial use" and while it has positives for the environment, it also provides solid opportunities for economic development.

At Grainger Station, Santee Cooper officially ended electric power production in December 2012, closing a chapter of reliable and cost-effective generation that began when the facility entered

commercial operation in 1966. There is a 40-acre ash pond on site, called "Pond 1," that contained approximately 1 million tons of pond ash. A second nearby pond, "Pond 2," contains about 300,000 cubic yards of pond ash.

The plans announced last fall will empty ash ponds at Grainger, Jefferies and Winyah stations over the next 10 to 15 years. Santee Cooper's general construction department is providing excavation, loading and transportation of the ash to the cement plants where it's converted into a useful product.

According to Grainger Station Manager Ernest Hardwick, a crew of six Santee Cooper employees are on site during the work week. Their job is to excavate and process the pond ash, which should total approximately 1.3 million tons of material when the project is completed by 2020.

"On a good day, about 1,400 tons can be excavated," says Hardwick, who spent 35 years working at Grainger. "We're excited about this project and the opportunity to provide a beneficial use for the ash."

Ash removal at Pond 1 begins by excavating ditches to lower the water level within areas that are actively excavated. A piece of heavy equipment, an excavator, loads the pond ash onto an off-road dump truck. From there, the truck will travel a very short distance to a processing and screening area, which separates unsuitable material from the ash particles. The screened and clean pond ash is then stockpiled. The stockpiled pond ash is then loaded to an over-the-road truck by a front-end loader. From there, it leaves the site.

Susan Jackson is Santee Cooper's manager of coal combustion residuals. She says the utility evaluated several disposal methods. A cap-and-vault system was considered, whereby material would stay on site, encapsulated in concrete.

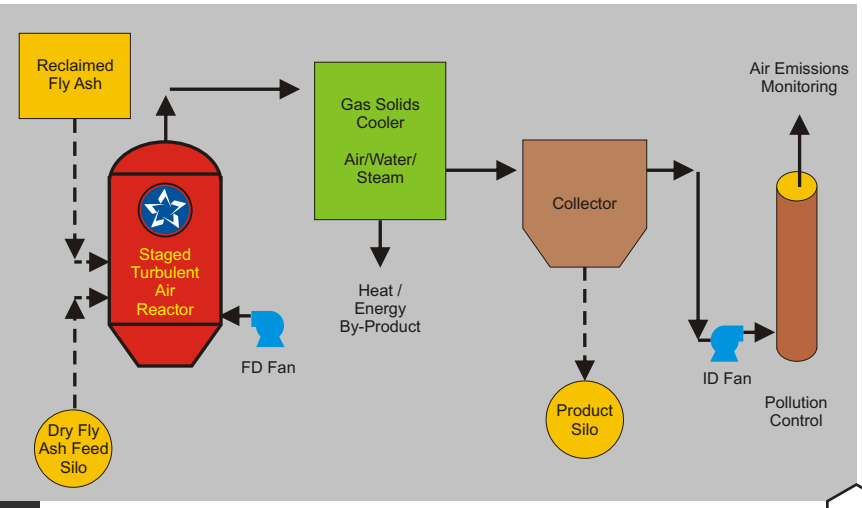
**We have a history of beneficial use with ash and gypsum. This is just upping our game.**


**Grainger Station Manager Ernest Hardwick is on-site at the Conway facility where approximately 1.3 million tons of pond ash is being excavated for beneficial use by industry. Since March, about 90,000 tons have been processed and at Jefferies Station, that figure is more than 45,000 tons. This year Santee Cooper has beneficially used more than 151,000 tons of fly ash and more than 36,000 tons of bottom ash.**

In the end, environmental and economic advantages of the beneficial use method put it over the top. The Environmental Protection Agency supports beneficial use of coal ash, and so does the state Department of Health and Environmental Control.

"DHEC was very pleased with this type of closure process," Jackson says. "This is a great project because instead of hauling the pond ash to a landfill, it's being put to beneficial use. We have a history of beneficial use with ash and gypsum. This is just upping our game."

Jackson says the Grainger excavation project has not affected water quality in the nearby Waccamaw River. Santee Cooper continues to monitor water quality, and both river water and groundwater are sampled regularly.


**Top:** This machine separates undesirable material from the pond ash at Jefferies Station. The pond ash is then stockpiled prior to being loaded onto trucks and leaving the station.

**Middle:** Thomas Kierspe, Santee Cooper's vice president of environmental, property and water system management, is always looking to expand Santee Cooper's beneficial use horizon.

**Process Flow Diagram:** The SEFA Group has received a patent from the U.S. Patent Office for its Staged Turbulent Air Reactor or STAR process, which recycles high-carbon fly ash at Winyah Station for beneficial use.

Since the 1970s, Santee Cooper has recycled material from the combustion of coal, including fly ash, bottom ash and gypsum. Prior to the recent recession, approximately 90 percent of such materials were put to beneficial use.

Santee Cooper coal ash helped build Charleston's Ravenel Bridge that spans the Cooper River, an iconic symbol of the Lowcountry. Then in 2008, American Gypsum began taking gypsum from Winyah Station to make wallboard at its plant, literally right next door. But the best is probably yet to come.

## A STAR is rising at Winyah Station

Last November, Santee Cooper and The SEFA Group Inc. announced a new chapter in their three-decades old relationship. Formerly known as Southeastern Fly Ash, the privately held firm unveiled plans to construct a $40 million plant to recycle high-carbon fly ash, up to 400,000 tons annually, at Winyah Station.

Even bigger news is that it will apply relatively new proprietary technology. The plant will replace an existing carbon-burnout or CBO facility that The SEFA Group owned and operated at Winyah Station.

The new process is called STAR, for Staged Turbulent Air Reactor. It's a patented process with bona fide trade secrets, and STAR is a registered trademark. STAR will produce what SEFA Group President Tom Hendrix terms "a pure mineral product, free of organic contaminants." Coal ash from Cross Station will also be transported for use at the STAR facility under construction now.

"We introduced STAR to the concrete industry in 2011, when we began operating our STAR plant in

Newburg, Maryland," Hendrix says. "The pure mineral matter produced by our STAR plants provides greater strength and durability in concrete than the fly ashes that were typically used to make concrete over the last several decades. Concrete producers prefer STAR, which not only enhances the quality of their concrete, but also lowers their cost."

Hendrix says the new STAR facility will also use fly ash from Winyah Station as a key component to manufacture other products that will be used in paints, plastics and rubber products.

Based in Lexington, S.C., The SEFA Group was founded in 1976. The firm has been using Santee Cooper coal ash since the 1990s, starting at Cross Station with gypsum production, which is still produced there. Marketing its product successfully is built upon Hendrix and his team getting to know the electric utilities it depends on.

"The SEFA Group's marketing philosophies are based in the belief that the optimum amount of fly ash should be used in every yard of concrete produced," Hendrix says. "This can only be accomplished by developing close working relationships with our customers and utilities. Santee Cooper has been a great partner for so many years. They've always had the right attitude about using ash products in an environmentally friendly way."

Santee Cooper is leasing 6.5 acres of land at Winyah Station to The SEFA Group for the STAR project. Hendrix anticipates start-up operations and testing before year's end with production going full bore in the first quarter of 2015.

Another key component to getting the STAR project going at Winyah is the issuance of $40 million in tax-exempt revenue bonds by the S.C. Jobs-Economic Development Authority (JEDA), a quasi-state agency based in Columbia. The bond issue was announced this past July.

## CONTINUING DOWN THE TRAIL TO ZERO WASTE

Santee Cooper continues to find new ways to be environmentally friendly. In addition to its proactive combustion byproducts reuse program, Santee Cooper has made recent strides in the area of corporate recycling with the growth of single-stream recycling.

Single-stream recycling is a system in which paper, plastics, metals, and recyclable materials can be tossed in one container without the inconvenience of pre-sorting. Santee Cooper's investment recovery department started placing single-stream bins throughout the company a little over two years ago.

"Santee Cooper is recycling traditional office supplies such as paper, plastic, glass, cardboard boxes, and metal cans," said Aurelia Smith, investment recovery agent. "Changes in technology are allowing more items to be recycled, and we continue to monitor our waste stream to see what is being thrown away and what can be recycled."

Through this monitoring, Santee Cooper's path to reducing its corporate waste stream becomes easier to follow. The investment recovery department spearheads Santee Cooper's corporate recycling efforts and works to grow employee participation through raised awareness and education.

To promote the streamlined recycling process, investment recovery worked with corporate communications in late 2012 to produce a music video called "Toss It Baby." It remains one of Santee Cooper's most popular social media pieces and can be found on Santee Cooper's YouTube channel.

Smith says investment recovery also conducts annual trash surveys that measure the amount of recyclable materials being discarded rather than recycled.

For investment recovery's efforts, Santee Cooper has received numerous awards for outstanding recycling. These awards include the Smart Business Recycling Award from the Department of Health and Environmental Control and the Outstanding Business Recycling Program Award from the Carolina Recycling Association.

In addition to slimming Santee Cooper's corporate waste stream, investment recovery also continues its work to repurpose older, still-functional equipment to help the utility also keep down costs.

***By Benjamin Ollic, Corporate Communications Intern***

According to its website, "JEDA serves as a statewide conduit issuer of special obligation revenue bonds and acts on behalf of the borrower to access financial markets and capital, and promotes the business and economic welfare of South Carolina by assisting in the financing of public and private projects throughout the state."

"JEDA was a blessing to everybody," Hendrix says. "They're so easy to work with. Their role in this project cannot be minimized."

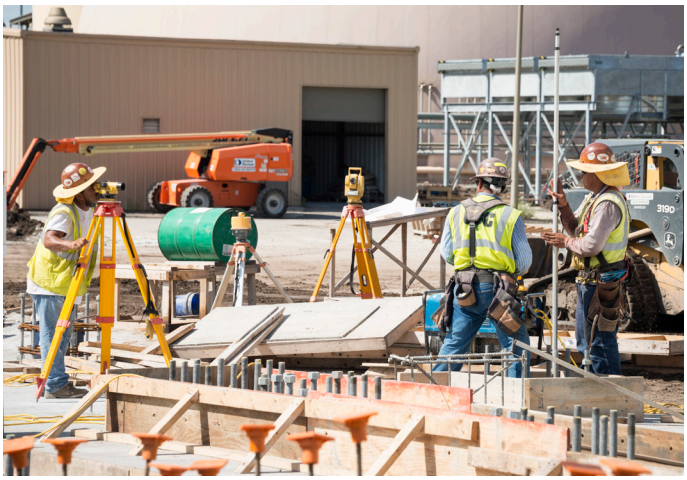
The SEFA Group has 165 employees, including an engineering and construction department and a transportation group with nearly 70 trucks. The latest STAR project will add 40 more jobs and 10 more trucks. Hendrix is bullish on the future and is proud of his firm's public-private partnerships.

Michael Davis, Winyah Station's manager, is excited about what will happen to coal ash at Winyah after the STAR plant is up and running.

"It's a great thing for Santee Cooper," Davis says. "Coal ash has become a very big concern for utilities from an environmental and regulatory standpoint. Historically, it's been ponded. SEFA's STAR project allows us to refine the ash into a useful product. It will eventually be used for construction, in highways, and concrete block. We're very glad to have them here. STAR doesn't affect power production, and our combustion process won't have to be changed."

Thomas Kierspe, Santee Cooper's vice president of environmental, property and water system management, sees the future for beneficial use from coal ash as a very promising horizon. He credits Santee Cooper's leadership, who decades ago positioned the utility to be a pacesetter in how it handles coal ash disposal, as one reason projects such as STAR are happening.

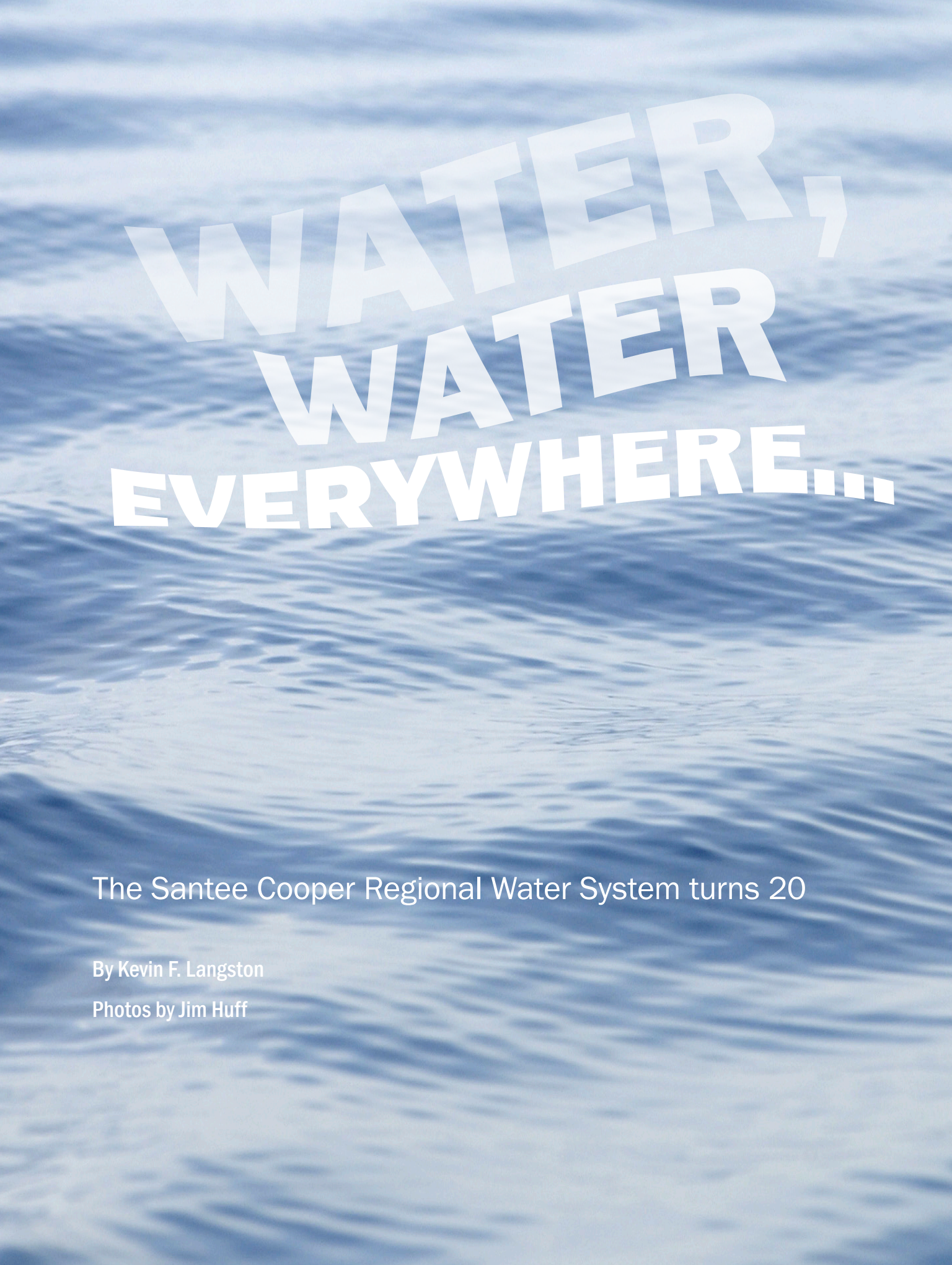
"Our management and board allowed us to move forward," Kierspe says, "to be proactive and apply long-term strategy. We're always looking for opportunities."



**Previous page:** The SEFA Group has leased 6.5 acres of land at Santee Cooper's Winyah Station where this $40 million plant is being constructed to recycle high-carbon fly ash using its patented, proprietary process. The vertical silos shown here have the ability to store about 1,000 tons of fly ash.

**Top:** When the plant is completed in the next several months, up to 15,000 tons of fly ash will be housed under the dome at The SEFA Group's STAR facility at Winyah Station.

Tradesman and engineers work on the project. The SEFA Group created approximately 80 construction jobs at Winyah Station to build its STAR facility.



# WATER, WATER EVERYWHERE...

## The Santee Cooper Regional Water System turns 20

By Kevin F. Langston

Photos by Jim Huff

# “I believe that water is the only drink for a wise man. . .”

**— Henry David Thoreau. “Walden.” 1854.**

Water is in Santee Cooper’s DNA. Our roots lay in the development of the Santee Canal, a 22-mile long waterway that connected the Santee and Cooper rivers by way of a system of navigation locks. Opened in 1800, it remained in service for 50 years before it fell victim to repeated droughts and the emergence of the railroad.

Santee Cooper, the electric utility, was created in 1934 by an act of the South Carolina General Assembly to build and operate the Santee Cooper Hydroelectric and Navigation Project. In addition to building a state-of-the-art hydroelectric facility, it created lakes Marion and Moultrie, South Carolina’s largest freshwater resource.

Sixty years later, Santee Cooper became an electric *and water* utility when the Santee Cooper Regional Water System entered commercial operation on Oct. 1, 1994. It was the culmination of many years of planning and collaboration between Santee Cooper and four local agencies united by a common goal to provide reliable and affordable water services.

It was a lengthy, meticulous process that would require an amendment to Santee Cooper’s enabling legislation and the creation of a joint municipal water agency known as the Lake Moultrie Water Agency (LMWA): comprised of Berkeley County Water & Sanitation, the city of Goose Creek, Moncks Corner Public Works Commission, and Summerville Commissioners of Public Works.

For the LMWA’s four member agencies, the Santee Cooper Regional Water System remains a model to emulate. Its story begins in Goose Creek.

**Located on the shore of Lake Moultrie near Moncks Corner, the Santee Cooper Regional Water System's treatment plant was built to treat 24 million gallons of water per day. The facility is undergoing an expansion that will increase its treatment capacity to 40 million gallons per day.**

Incorporated in 1961, Goose Creek's infancy was plagued by water problems. It relied on shallow wells for its first 10 years, but they proved inadequate for the young city. The water was also said to have a strong sulfuric taste.

"It was pretty nasty stuff. We had people traveling to Charleston and North Charleston to buy bottled water," says Goose Creek Mayor Michael Heitzler.

In 1971, Goose Creek signed a 20-year contract with the Charleston Commissioners of Public Works (known as the Charleston Water System), effectively retiring its system of wells.

"We were much relieved by being able to tap into Charleston County," Heitzler says. "We envisioned it as a long-term solution. They were the only purveyor available to us."

While reliability and taste were improved, Heitzler says costs increased too rapidly for Goose Creek's comfort.

In 1981, Goose Creek began work on a municipal strategic plan that called for a better water distribution system and a reliable, less expensive water source. Years prior, a study had been commissioned by the Berkeley-Charleston-Dorchester Council of Governments that had identified the Santee Cooper Lakes as a long-term source of water for the Lowcountry.

"It was Dennis Harmon who envisioned a source of our own that would relieve us

from our dependency on Charleston," Heitzler says. Harmon has been Goose Creek's city administrator since 1978, the year Heitzler was elected mayor.

"We were taking our total supply from Charleston, but we didn't see it as a viable financial arrangement," Harmon says. "We also had several instances of low water pressure. We needed to secure adequate supply and adequate pressure for our residents and for fire protection services."


Goose Creek approached Santee Cooper in 1986 about tapping the Tailrace Canal, which connects the Santee Cooper Lakes to the Cooper River. Santee Cooper was receptive to the idea but was uncomfortable with establishing a precedent that might lead to multiple municipalities tapping into the lake system.

"It was such a radical idea and beyond Santee Cooper's business operations. This was a power company, and here we were talking to them about water," Heitzler says.

At this point, Harmon says word of their plans became somewhat public knowledge at which point Berkeley County, Summerville, and Moncks Corner expressed a similar interest.

Mark Hehn, director of Berkeley County Water & Sanitation at the time, says they were also contracting with the Charleston County Commissioners of Public Works.

"It was a long-term contract that was set to expire," Hehn says. "We were experiencing low water pressure — below what's required for fire protection — during dry periods, and it got to be more and more of a problem."

Charles Cuzzell, manager of the Summerville Commissioners of Public Works, says they were facing a similar predicament.

"We were on a deep-well system. A lot of them were 1,000 to 1,200 feet deep, and it's the same aquifer that Mount. Pleasant uses," Cuzzell says. "At that time we were limited in our capacity and our quality. So we embarked on a study to find some alternatives."

Some of the options Summerville explored were reverse osmosis, tapping the Edisto River and building a treatment plant, and contracting with Charleston County, but they all presented their own drawbacks. They kept coming back to the Santee Cooper Lakes as their best hope.

"It's a great regional resource," Cuzzell says. "It's the second-largest watershed east of the Mississippi, and it's kind of a well-kept secret."






Harmon says Goose Creek was initially hesitant to pursue a multi-agency approach to solve its water woes.

"I remember thinking that we were going to be slowed down considerably by the addition of three additional partners," he says. "But it became apparent pretty early on that we were going to need a regional approach in order to get it done. It was almost inevitable that Santee Cooper would build and operate the treatment plant. They were the only ones who had the ability, and they kept the rest of us from getting too self-absorbed."

"We liked the concept of working with our neighbors, and the timing was right," Cuzzell says. "Everybody had a seat at the table, and Santee Cooper had a real positive attitude from the beginning. Everyone felt like a part of the process."

"These weren't contentious meetings at all," Harmon says. "We just wanted to get it right, and we reached a pretty solid agreement because we took our time."

"We never made it political," Cuzzell says. "It was always about providing the best customer service to the people we serve. We weren't concerned with who got the credit. We just wanted this to be successful."

In July 1991, Santee Cooper announced plans for the Santee Cooper Regional Water System with a capacity of 24-million gallons of water per day (or mgd) and 23 miles of pipeline. The following spring, the Santee Cooper Board of Directors approved the construction and operation of a water treatment plant on the shore of Lake Moultrie near Moncks Corner.

In the summer of 1992, the Moncks Corner Public Works Commission, the Summerville Commissioners of Public Works, the city of Goose Creek, and Berkeley County Water & Sanitation each committed to joining the Lake Moultrie Water Agency. On Oct. 2, 1992, the Lake Moultrie Water Agency was created.

Under its agreement with Santee Cooper, the Lake Moultrie Water Agency would own 100 percent of the water treatment plant's capacity and sell it to the four agency members.

"We didn't have to give up anything," Cuzzell says. "The relationship we had with our customers stayed the same. We weren't absorbed into a larger entity. We became part of a larger whole."

Construction on the water treatment plant began in February 1993, and the first water was drawn from Lake Moultrie and treated on Aug. 11, 1994. The Santee Cooper Regional Water System delivered its first water to the Lake Moultrie Water Agency's four members between Sept. 20 and 26 and entered commercial operation on Oct. 1, 1994.

"No project, no program, no initiative in the city of Goose Creek since Dennis and I came on board in 1978 has been more important to us than this," Heitzler says.

**The Lake Moultrie Water Agency is a joint municipal water agency comprised of Berkeley County Water & Sanitation, the city of Goose Creek, Moncks Corner Public Works Commission, and Summerville Commissioners of Public Works.**

On hand in October 1994 for the Santee Cooper Regional Water System's ribbon-cutting ceremony were former Santee Cooper board member John Trout, former Santee Cooper President and CEO T. Graham Edwards, the late Gov. Carroll A. Campbell Jr., former Santee Cooper President and CEO Kenneth R. Ford, former Chairman of the Santee Cooper Board of Directors John S. Rainey, and Goose Creek Mayor Michael J. Heitzler.

Harmon says Goose Creek hasn't needed to implement a rate increase in the 20 years since the water treatment plant began operation, "which is pretty much unheard of."

"It worked out to everyone's benefit," Hehn says.

"Without that water, you don't have development," Harmon says. "Google, Nucor, Alcoa, Carnes Crossroads, Cane Bay, Nexton, Crowfield Plantation: They would not be possible without that water."

The Santee Cooper Regional Water System is currently expanding its capacity to 40 million mgd, and Berkeley County is a large reason for that expansion. Since 1977, Berkeley is the only county in the state to have four individual years with more than $1 billion in capital investments.

"We're the fastest growing county in South Carolina and the 35th fastest in the nation," says Colin Martin, executive director of Berkeley County Water & Sanitation. "We're a very attractive place to live now. We've seen it happen to Mount Pleasant and Daniel Island, and now it's making its way toward us. I suspect Berkeley County will remain the fastest growing county in the state for a while, and we've got to be ready for that."

Martin says Berkeley County Water & Sanitation is taking the "lion's share" of the new capacity and is paying $20 million of its $37 million price tag.

"I think the common goal that brought these four agencies together has carried them these past 20 years. These relationships have been particularly important these past two years as we discussed expanding the treatment plant," Martin says. "I've never seen an organization such as this work so well together. It's a mutually supportive relationship that I haven't seen in other governmental relationships."

"Nothing has been more important to the development of our community than this water system," Heitzler says. "Take Carnes Crossroads: That wouldn't be here without the Santee Cooper Regional Water System. It's going to be the busiest intersection in South Carolina within 15 years, and nobody up there building and developing can fully appreciate what that water treatment plant has meant to us."

"It's one of the best examples of public-entity cooperation that I've seen in my career," Harmon says. "I would hold it up as a model for the state. Goose Creek is a stronger town, and the Santee Cooper Regional Water System has been a part of that."

"Twenty years on, and I don't think anyone can step forward and tell us this hasn't been successful," Cuzzell says. "The proof is there in those 20 years and in the work we did leading up to it."


# TRIUMPH OVER TRAGEDY:

*A look back to Hurricane Hugo 25 years later*

By:
Nicole A. Aiello

Photography:
Jim Huff

"Saturday, Sept. 9, a group of thunderstorms form off the West African coast near Dakar, heading west across the Atlantic. By Sept. 10, the storm is upgraded to a tropical depression. It is the 11th tropical storm since the Atlantic Hurricane season began June 1st. It would be named Hugo."
—"Bringing Back the Light"

Hurricane Hugo stormed across the Atlantic Ocean in September of 1989, leaving a trail of destruction in its wake.

As it thrashed through Guadeloupe, Puerto Rico and St. Croix, the alarm was sounded on the East Coast: It looked like Hugo was on its way to the Carolinas.

South Carolinians braced themselves as menacing winds and rain came ashore just north of Charleston in the late evening hours of Sept. 21. Hugo slammed the coast as a Category 4 hurricane, with sustained winds around 135 mph and a storm surge of up to 20 feet.

Homes were blown off their foundations. Trees succumbed to the winds. Roads were covered in debris and sand. And the lights went out.

"Hugo made landfall, and we lost transmission lines and distribution lines. All of our generating units tripped offline. We were completely in the dark," said Ernest Hardwick, manager of Santee Cooper's Grainger Generating Station in Conway. Hardwick has been with the company since 1979 and was an operations superintendent at Grainger Station in 1989.

"Coming into Conway, it was pitch black. It was dark," said Mike Poston, Santee Cooper's vice president of retail services. Poston had been working as an associate engineer at the time. "Getting to the office the morning after the storm and finding out we didn't have any generation on throughout the whole state, it was just shocking. I never expected that."

To this day, it is the first and only time Santee Cooper's electric system went completely dark.

Employees now had to embark on a system-restoration plan, beginning with a "black start" of the Myrtle Beach Combustion Turbines. Getting the turbines running was the only way to get the larger Grainger Station back online and to get power back to customers. To do that, electric load was needed, and balancing load created a tenuous situation.

"It's really tricky to start up a generating unit. When you generate electricity, you need it to be consumed at the same time. You need to have somewhere for the electricity to go," Hardwick explained. "It was hard to match but if we didn't, the frequency would go crazy. We needed enough load on the system with the Myrtle Beach turbines so we could get Grainger up and running."

Tricky may be an understatement. Hugo had not only severely damaged the electric system, it also damaged most means of communication, and communication was imperative when it came to balancing electric load with electric generation.

Some phone lines were still working, although it took much effort to get connected. At Grainger, three phone lines stayed connected at all times because employees worried they wouldn't be able to reconnect if they hung up. And they needed to talk to each other to balance load and keep the turbines running. It was like setting up dominoes; if one piece was unstable, the rest came crashing down. It was a risk Santee Cooper employees had to take.

**Hurricane Hugo caused much destruction to South Carolina and to the Santee Cooper system. Trees and utility poles were snapped in half, which showed the brute strength of the storm.**

**Right: Santee Cooper's headquarters, located in Moncks Corner about 40 miles inland from the Isle of Palms, sustained substantial damage from the storm. Many employees battled their way to work on Sept. 22, 1989, with the help of chainsaws because of the immense number of felled trees in the area.**

Nicole Aiello, part of Santee Cooper's corporate communications team, talks with employees Mike Poston, Diane Bell and Jay Jeffcoat as they recall their Hugo experiences. Video of the interview is available on our iPad app and on Santee Cooper's YouTube channel.

A multitude of beach homes were destroyed as Hurricane Hugo slammed the coast on Sept. 21, 1989. Much of the oceanfront property in Pawleys Island and Garden City was destroyed.

"I never remembered a fear here. Just like any other storm, everybody comes together. We decide we're going to make it happen. It's what we do," Poston said. "Once we got going and the crews started making repairs, we were in motion.

"As we would put a circuit on, I'd get on the line with Ernest and let him know we were closing the breaker," said Poston. "If there was a fault, Ernest would say the generator sounded like it was coming off the pad. Any fault that happened on the distribution system was felt at Grainger."

That means something as simple as a tree limb on a line could disrupt the progress everyone had worked so hard on. Although there were a large number of trees impacting power lines, it was something else that first night that caused the most problems.

"That's when the fireworks started. We had salt spray on our insulators, and when the temperatures started to lower they started flashing and arcing," Hardwick said. "We'd be running along and all of the sudden, we'd take a hit. I've got cold chills all over my body now just thinking of it."

Because of the salt spray on equipment, many of the circuits that had been connected went dark again.

"I was at my house that night in Garden City and I could see the lights on toward Myrtle Beach. All of the sudden you'd see a flash and then another flash and then another flash. Basically, we just watched everything we'd done come down," remembers Jay Jeffcoat, now a general supervisor with distribution control and technical support. Jeffcoat was in his first year at Santee Cooper when Hugo hit.

Diane Bell, now Santee Cooper's manager of distribution planning and technical operations, was relaying Jeffcoat's damage reports to line crews.

Talking about the salt spray's effects, Bell said, "We were a little depressed about that and about having to start over. Then we got the worst rainstorm. It came down in buckets. It was adding insult to injury. It turns out the storm was the best thing that could have happened because it washed all the salt off the lines. Once it did that, we didn't have the arcing anymore and the lines were able to stay on."

After that, the race was back on to repair damage caused by Hugo and get power back to Santee Cooper customers, including the electric cooperatives. Santee Cooper employees worked day and night to restore power. It took determination, courage and patience.

It was an extraordinary effort, and electricity was restored for all of our customers able to

> ***"All of the sudden you'd see a flash and then another flash and then another flash. Basically, we just watched everything we'd done come down."***

## HURRICANE HUGO TIMELINE & FACTS

**Sept. 9** / Thunderstorms form off the West African coast and become a tropical storm two days later.

**Sept. 13** / The tropical storm is upgraded to hurricane status and becomes Hurricane Hugo.

**Sept. 15** / Hurricane Hugo reaches Category 4 status. At one point, Hugo briefly becomes a Category 5 storm.

**Sept. 17** / Hurricane Hugo hits Guadeloupe, Montserrat and St. Croix, destroying or damaging more than 90 percent of the buildings on St. Croix.

**Sept. 18** / Hugo slams into Puerto Rico as a Category 3 hurricane with a 17-foot storm surge. As Hugo travels over land, it is downgraded to a Category 2. Once back over the open water, Hugo again strengthens to a Category 4 hurricane.

**Sept. 21** / Hurricane warnings are issued for areas from Fernandina Beach, Fla., to Cape Lookout, N.C. Hugo's forward speed increases to 25-30 mph. Just before midnight, Hurricane Hugo comes ashore at the Isle of Palms with winds of more than 135 mph and a 20-foot storm surge.

**Sept. 22** / By 2 a.m., Santee Cooper loses all generation for the first time in its history. Employees work to get the Myrtle Beach Combustion Turbines running so they can start up other generating stations, beginning with Grainger Generating Station in Conway. Patches of light begin to show up in the first 12 hours. As evening draws near, salt spray on the lines causes faults and outages. Thunderstorms wash salt spray off equipment.

**Sept. 23-24** / Santee Cooper continues restoration efforts and many areas get some power.

**Sept. 27** / Berkeley Electric Cooperative, Conway and Florence are energized.

**Sept. 29** / Santee Cooper restores power to 100 percent in Myrtle Beach and North Myrtle Beach.

**Sept. 30** / Only 10 percent of customers are without power.

**Oct. 4** / All electric cooperatives served by Santee Cooper have power.

**Oct. 5** / 9:46 p.m.: Santee Cooper restores power to all customers who can receive power.


**Santee Cooper's system was severely damaged, including transmission and distribution lines. Employees and more than 400 additional workers from neighboring states helped rebuild the system and bring power back to Santee Cooper's customers.**

**Left:** Downed trees was a common sight for weeks after the storm hit.

**Above:** Santee Cooper's President and CEO Lonnie Carter, who worked for Santee Cooper during the storm, recalls his experiences.

receive it by Oct. 5, just two weeks after Hugo left thousands of people in the dark.

Santee Cooper President and CEO Lonnie Carter, who worked the aftermath of Hugo in Moncks Corner as a liaison with the electric cooperatives and the large industrial customers, remembers it vividly.

"As I look back on it today, I think it's remarkable how quickly we restored service," said Carter. "It's really a testament to how well Santee Cooper people and all of our stakeholders, the electric cooperative folks and people in the community, pulled together. It was a rewarding time."

"...when Hurricane Hugo hit, the greatest surge of power came from the people of South Carolina. Their force of resilience, determination, and strong will swept through the state as a thunderous chorus of people pulling together to triumph over tragedy."

—Santee Cooper Calendar Year 1989 Annual Report

## Hurricane Hazel

This year also marks the 60th anniversary of Hurricane Hazel, which made landfall as a Category 4 storm on the morning of Oct. 15, 1954, at the border of South Carolina and North Carolina. The coastal area where Hazel came ashore was buffeted with winds as high as 150 mph. The storm coincided with a lunar high tide and brought with it a storm surge of up to 18 feet in some areas.

Myrtle Beach reported wind gusts up to 106 mph before the storm continued its way inland and up the coast. It's been reported that New York City had peak gusts up to 113 mph.

Hazel brought much damage and destruction with it. According to NOAA.gov, the December 1954 NOAA report on the hurricanes of the year states that "every pier in a distance of 170 miles of coastline was demolished." In the Cherry Grove section of North Myrtle Beach, nearly 75 percent of homes were destroyed. Damages in the Carolinas alone were $163 million, with beachfront property incurring around $61 million of that.

Santee Cooper also felt the brunt of Hazel. Santee Cooper's annual report for the fiscal year ending June 30, 1955, states all lines at Garden City were lost; all facilities along the first three streets in Windy Hill Beach, Crescent Beach, Ocean Drive Beach and Cherry Grove Beach were almost entirely lost; and Conway and Loris incurred significant damage. In Georgetown County, the report said distribution facilities on and around Pawley's Island suffered severe damage, and large areas were almost completely destroyed on the island and around Brookgreen Gardens.

**Editor's note:** *This is just one of a multitude of recollections from people who experienced Hurricane Hugo. For more, including the story from 1989 on how Santee Cooper used wood from the storm to power homes, visit our website or download our iPad app.*

# Former board member Johnnie Mac Walters is remembered

Former Santee Cooper board member Johnnie Mac Walters, who represented the 4th Congressional District, died June 24 in Greenville after a long illness.

Walters served on the board from 1993 to 2000. A U.S. Army Air Corps veteran of World War II, Walters flew 53 missions in Europe as a B-17 navigator. Educated at Furman University, the Lydia, S.C., native earned a law degree from the University of Michigan and served as Internal Revenue Service commissioner from 1971 to 1973.

During the Watergate scandal, Walters had the courage to defy President Nixon, who wanted to exploit the power of the IRS to learn information about his administration's political opponents. Watergate transgressions eventually resulted in the president's resignation in August 1974. In his memoir, "Our Journey," Walters wrote, "By refusing to implement the request we preserved our tax system and also kept me out of jail." This display of integrity earned Walters bipartisan admiration.

John S. Rainey, who served as Santee Cooper board chairman, remembered Walters in an op-ed piece in the Greenville News, published after Walter's passing.

"America lost a man this June the likes of which were once more common, but over recent years have become increasingly rare," Rainey wrote. "Johnnie Mac Walters came of age during a time, hopefully not the last time, when men understood that character and duty not only matter, but also are indispensable in a free and just society."

# Santee Cooper's Environmental Intern Program:

## *Cultivating Tomorrow's Energy Minds Today*

Story and Photos by Hayden Grooms

Corporate Communications Intern

Renewable energy is a relatively new frontier in the energy industry, with incredible advancements being made every year. As utilities and private companies continue seeking out affordable and reliable sources of renewable energy, every summer Santee Cooper helps train some of the young minds that might eventually solve this riddle.

The Environmental Intern program welcomes 12 college students from across South Carolina and provides them the opportunity to work in various departments at Santee Cooper including air quality, vector management, analytical and biological services, environmental services, renewable resources, and property management. Part of their internship involved renewable energy research.

As renewable energy continues to be deployed and developed, these interns become more aware of its challenges and opportunities. The hope is that with a solid foundation of electric-utility experience, better solutions will arise from these young minds.

Educating the interns about Santee Cooper's strong history of environmental stewardship is an important first step. And the Environmental Interns are paying close attention.

"We do everything we can to be environmentally friendly, but as a coal-burning producer of electricity, some people tend to view us in a negative light," said Benjamin Sagara, a senior from Simpsonville majoring in biology at the College of Charleston. "There's a hard balance between keeping costs low for electricity and adding renewables."

Will Norris, a junior from Columbia majoring in mechanical engineering at Clemson University, said his biggest takeaway has been learning how much effort Santee Cooper puts into generating the cleanest power possible.

“Before this experience I didn’t know everything that went into producing electricity. I thought you just burned coal, which makes steam that turns a turbine. I didn’t realize how much went into cutting back on pollution. There are scrubbers, a number of filters, limestone slurry that removes the sulfur. The whole process was just impressive,” he said.

Norris also expressed how important a balance of energy resources is to being environmentally efficient. It’s a point that is stressed throughout the 10-week internship, and all of the interns said that finding a balance between renewable energy and traditional fossil fuels is critical to the energy industry.

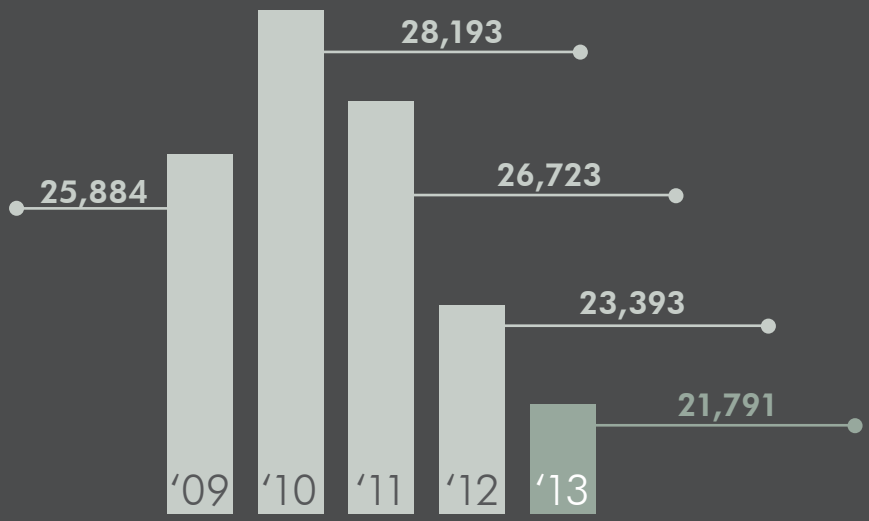
*“I didn’t realize how much went into cutting back on pollution... The whole process was just impressive.”*

Leila Miles, a senior from Charleston majoring in civil and environmental engineering at the University of South Carolina, said Santee Cooper is doing all it can in this endeavor.

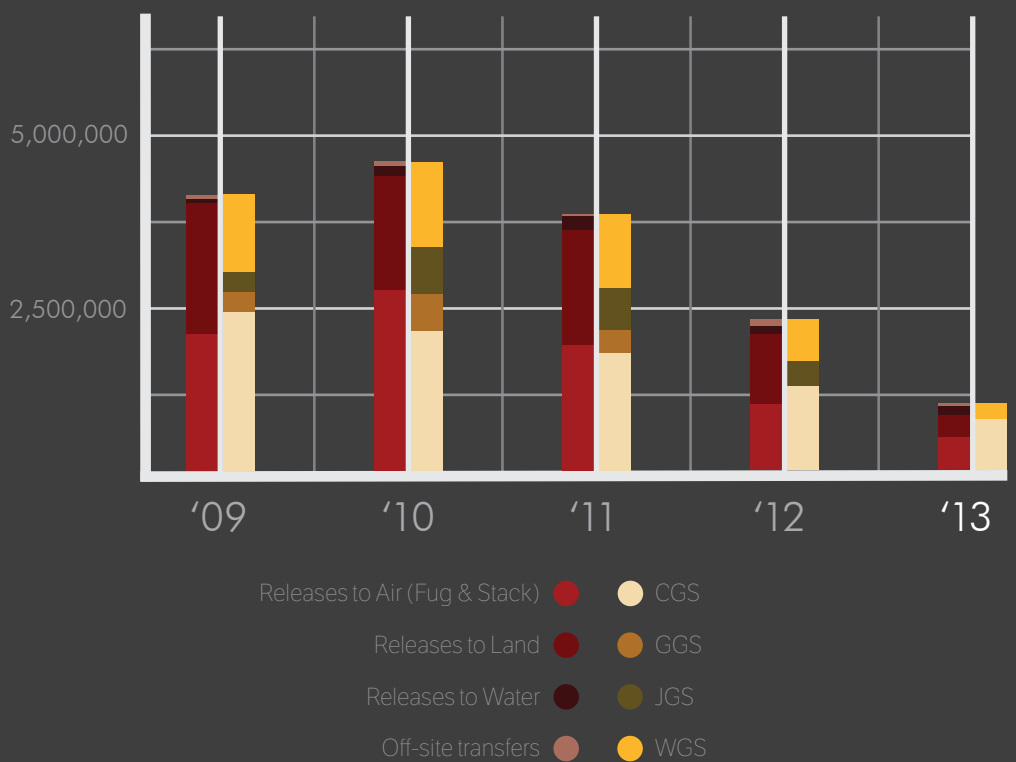
“We are slowly reducing our reliance on coal, but it will take a very long time. We have a good balance between burning of fossil fuels and renewable energy. And renewable energy is not the end-all,” Miles said. “Solar energy, for example, is still incredibly expensive for how little power you get. I believe we need to focus on making the things that we have more efficient, rather than spending big money on theoretical solutions. Everything you do, you should try and make it as efficient as possible.”

# ENVIRONMENTAL FALL 14 PERFORMANCE

## GENERATION, GWh

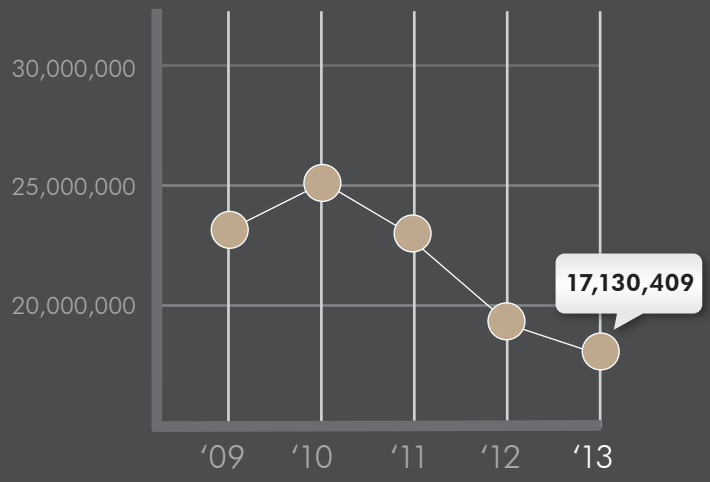



## REPORTABLE TRI RELEASES, lb

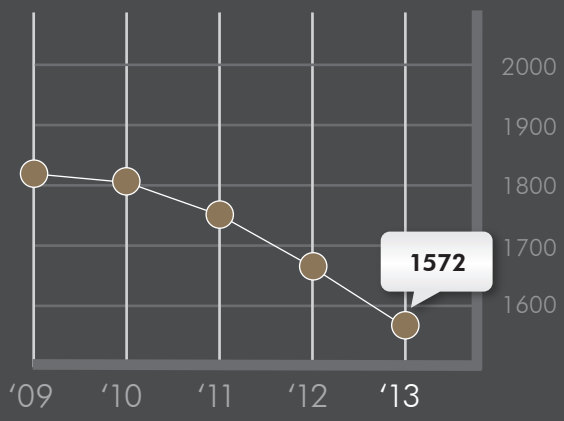


# CO2 EMISSIONS

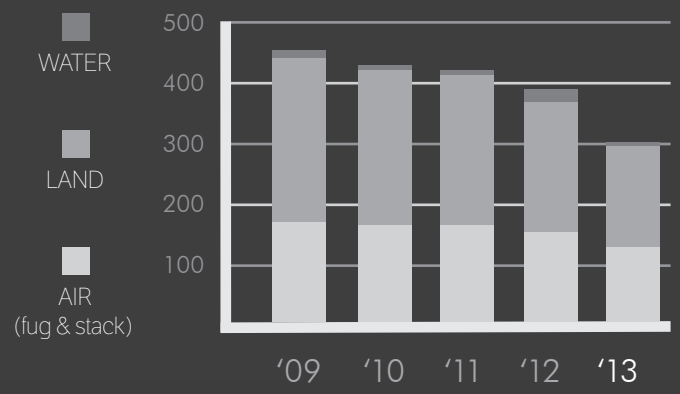
## TONS



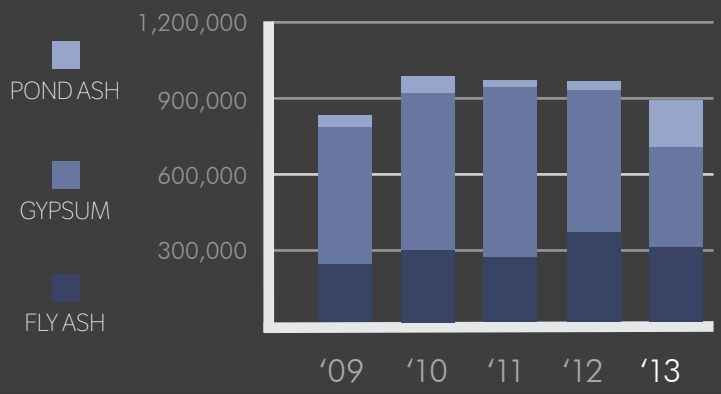

## lb/MWh




# TOTAL MERCURY RELEASES, lb

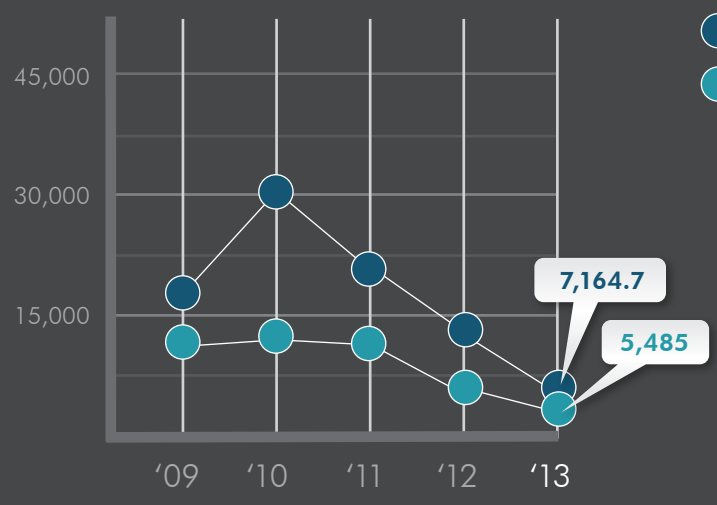



# COAL COMBUSTION PRODUCTS UTILIZATION, tons

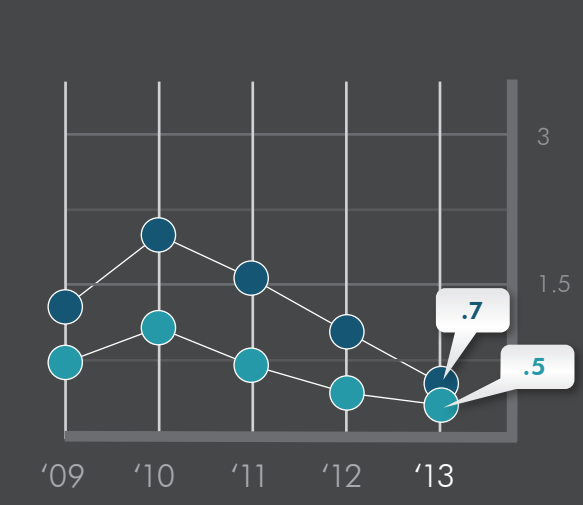



# $SO_2$ AND $NO_X$ EMISSIONS

## TONS




## lb/MWh



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